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THE CENTER FOR INTERNATIONAL ENVIRONMENT & RESOURCE POLICY

ENERGY, CLIMATE, AND INNOVATION PROGRAM
THE FLETCHER SCHOOL
TUFTS UNIVERSITY

Post-Paris Research Needs in Climate Change Policy

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Energy, Climate, and Innovation Program (ECI)
Center for International Environment and Resource Policy (CIERP)

The Fletcher School
Tufts University
Cabot Intercultural Center, Suite 509
160 Packard Avenue
Medford, MA 02155

www.fletcher.tufts.edu/cierp

The Fletcher School at Tufts University was established in 1933 as the first graduate school of international affairs in the United States. The primary aim of The Fletcher School is to offer a broad program of professional education in international relations to a select group of graduate students committed to maintaining the stability and prosperity of a complex, challenging, and increasingly global society.

The Center for International Environment and Resource Policy (CIERP) was established in 1992 to support the growing demand for international environmental leaders. The Center provides an interdisciplinary approach to educate graduate students at The Fletcher School. The program integrates emerging science, engineering, and business concepts with more traditional subjects such as economics, international law and policy, negotiation, diplomacy, resource management, and governance systems.

The Energy, Climate, and Innovation Program (ECI) advances policy-relevant knowledge to address energy-related challenges and opportunities, especially pertaining to climate change. ECI focuses particularly on how energy-technology innovation can be better harnessed to improve human well-being, and the role of policy in the innovation process. Although ECI's outlook is global, we concentrate mainly on energy and climate policy within, and between, the United States and China. We also focus on how these countries influence the international negotiations on climate change, and the role of technology in the negotiations.

Foreward

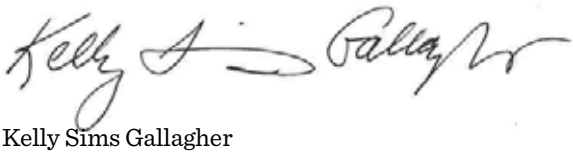
This discussion paper is intended for governments, business leaders, philanthropists, researchers, scholars and students. The paper clarifies the most pressing research needs in climate policy after the achievement of the Paris Agreement in December 2015. This is the second time that we have issued a discussion paper on research needs — the first was issued after the 15th Conference of Parties in Copenhagen when the emphasis was much more on how to rescue the international process.

For those who support climate policy research, this paper should clarify the funding priorities. For those who conduct research, this paper provides you with a ready-made list of concrete, well-developed research questions that urgently need to be answered. For policymakers, this is an invitation to engage closely with the scholarly community as research on climate policy moves forward.

It is well recognized that the Paris Agreement was a monumental step forward, but far from sufficient. If anything, the policy challenges are even more daunting as governments begin to implement their Nationally-Determined Contributions domestically, as nations endeavor to become more resilient to climate change impacts that are becoming ever more apparent, and as the issues that were deferred in Paris are taken up in the UNFCCC process.

Here, we attempt to prioritize the research needs to clarify the knowledge gaps that exist. To the readers, we hope to hear from you as you consider this list and think of other questions. We plan to update the paper periodically, and we at the Center for International Environment and Resource Policy (CIERP) intend to tackle some of the questions ourselves through CIERP's Climate Policy Lab, which can be found at http://fletcher.tufts.edu/CIERP/Research/Projects/Climate-Policy-Lab. I encourage you to send me questions to add to this list at kelly.gallagher@tufts.edu.

Best regards,



Kelly Sims Gallagher
Professor of Energy & Environmental Policy
Director, CIERP

Introduction

During and following the 21st Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris, France in December 2015, the Climate Policy Lab of the Center for International Environment and Resource Policy (CIERP) at The Fletcher School, Tufts University, carried out a consultative process with policymakers, scholars, and leaders from non-profit organizations regarding the post-Paris research agenda. The purpose of this initiative was to identify specific analytical gaps and topics for social science scholarly inquiry that could be taken up by academic institutions and researchers in order to better serve international climate policy going forward. This paper does not aim to identify the most pressing natural science research needs.

A roundtable discussion was convened in Paris on December 6th chaired by Prof. Kelly Sims Gallagher of the Fletcher School and Prof. Gilbert E. Metcalf of the Department of Economics, both at Tufts University. A second roundtable was held at Fletcher co-sponsored by CIERP and the Sustainable Finance Center at the World Resources Institute in April 2016 specifically on climate finance that focused in more detail on that particular topic. Others have been consulted along the way, and a full list of individuals is provided. None of these individuals should be associated with particular research questions or agendas. The distillation and prioritization of the research agenda presented in this discussion paper is the sole responsibility of the authors.

This discussion paper highlights the topics and questions that emerged as the most pressing, important, or salient now that the Paris Agreement exists. This paper is neither about the politics of climate policy nor is it intended to be a prescription for the next steps in the international climate negotiations. The authors also make no pretense of comprehensiveness; we recognize that there are many worthy areas of research not accounted for here.

Each research topic is converted into a crisp research question. We organize the paper around five cross-cutting research needs:

1. International climate policy architecture in the post-Paris context
2. Green finance
3. National and sub-national policy implementation
4. Policy analysis and evaluation tools
5. Innovation and learning

1. International Climate Policy Architecture in the Post-Paris Context

As the focus shifts towards implementation of the bottom-up Intended Nationally-Determined Contributions (INDCs) and consolidation of the new Paris institutions, research needs will reflect this shift in the international policy cycle. This section focuses on how to improve our understanding of the gaps and challenges in this emerging international architecture and how it can it be made more robust and fit for purpose.

1. What is the ideal role of the UNFCCC in the post-Paris era? What are the institutional gaps that will need to be filled for the effective implementation of the Paris Agreement? To what extent is the UNFCCC positioned to fill these gaps?

2. How can the regime establish norms to increase ambition and foster transformational change over time? What specific incentives can be built into the UNFCCC process to accelerate ambition? What kind of non-state initiatives would complement and provide the necessary information to allow for a truly comprehensive global stocktaking at regular intervals?

3. What should be the elements of mid-century low greenhouse gas emissions development strategies, which are mandated in the Paris Agreement?

4. How can the UNFCCC facilitate and support transparency in the reporting of domestic climate actions?

5. What role can the UNFCCC Secretariat play in catalyzing non-state and sub-national climate action? How can the coordination of such actions be improved?

6. What is the role for bilateral agreements, transnational initiatives, clubs, and mini-multilateralism in the climate process over the next decade, and what are the advantages of these approaches? How can such agreements build on the Paris architecture and facilitate a more ambitious and robust international climate governance architecture over time? What features would be necessary in such agreements? Does bringing transnational activities into the UNFCCC help to increase their effectiveness and legitimacy? Is there a reinforcement dynamic present whereby topics and regions that are already receiving attention get more while those that need the attention do not?

2. Green Finance

Now that countries have specified their INDCs and clarified their emissions-reduction, adaptation, and resilience goals, financing the achievement of these goals becomes a high priority. To complement traditional institutions, many additional financial institutions have emerged including the Climate Investment Funds, the Green Climate Fund, the South-South Fund, the New Development Bank, and the Asian Infrastructure Investment Bank. Meanwhile, the private sector is commercially funding ever more "green" projects even if they are not labeled as such. "Trillions" rather than "billions" will ultimately be required to achieve net-zero emissions and true resilience, and there is little debate about the fact that funds are not currently flowing at the scale required.

1. What is "green finance"? Definitions vary across institutions, development banks, and other funds. Do we need a clearer agreed-upon definition? If so, what is it? How does it differ from "climate finance"? Relatedly, what is the definition of a "green bond"? Do we need specific rules and governance procedures for these different types of green financing?

2. Which metrics should be used to assess the effectiveness of climate finance? What are the strengths and weaknesses of current approaches?

3. What are the specific, quantified financial flows for adaptation and resilience? What are the conceptual problems with measuring adaptation and resilience flows given the overlap with traditional development finance? How can these definitional challenges be managed in order to gain understanding of which resources can be considered as truly serving adaptation and resilience versus investments that should not be counted towards these goals?

4. What kinds of mechanisms and institutions improve developing countries' ability to attract and effectively utilize climate finance from the whole panoply of international climate finance institutions?

5. What are the emerging best practices regarding building capacity for direct access? What are the benefits and costs associated with direct access financing?

6. Are climate finance institutions designed to deliver the transformational change that the Paris Agreement envisions? If not, what are the barriers to achieving better institutional design?

7. How can development bank investments and official development assistance be made more climate-friendly? How can climate considerations be mainstreamed into "regular" or "traditional" finance? Which new policies, practices, and standards would be required? How could the private sector mainstream climate considerations into investment decisions?

8. How can the INDCs be translated into concrete investment plans? What are the specific differentiated needs of individual countries (or groups of countries)? How can climate finance be more country-driven and "fit for purpose"? How can the absorptive capacity of recipient governments be strengthened to match the scale and urgency of need? How do countries mobilize domestic finance well? How have they managed to blend domestic and international sources of finance?

9. How can financial institutions become faster and more flexible in processing applications and getting funds out the door? Can delivery be sped up without compromising on environmental and social safeguards?

10. What strategies could help ensure that climate finance supports broader human development needs, empowers communities and under-served groups, and safeguards human rights, while also delivering transformational change at scale?

11. What can be learned about what works well and what doesn't from existing climate finance institutions (e.g. the Global Environment Facility, Adaptation Fund, Climate Investment Funds)? How can learning be fostered across different institutions, and how can they themselves become learning institutions?

12. How can financial instruments be designed to be attractive to investors and the private sector, particularly when country risk or uncertainty is present? How can financial instruments be blended to de-risk investments in particular countries and what are the barriers to doing so?

13. What exactly are the features and components of the "stable and predictable policy environment" that are necessary to attract finance flows? Relatedly, what are the most effective existing instruments and policies at the national level to mobilize climate finance?

14. How do we avoid symbolic "failures" that result in inhibition or reduced financial flows (such occurred the Solyndra loan guarantee case in the United States)? How to guard against "reckless caution" that fails to take the risks required to achieve the Paris goals?

3. National and Sub-National Policy Implementation

While historically the global climate regime was focused on developing an overarching international institutional framework and setting global goals and targets, post-Paris, the focus necessarily shifts to national and sub-national implementation of domestic policies. Due to both the diversity of national circumstances and the wide range of approaches that countries will take in the implementation of mitigation, adaptation and resilience goals, there are many important opportunities for research to clarify the comparative advantages and disadvantages of different policy choices in different contexts. While considerable literature exists on the merits of certain types of policies theoretically, much less is known about how these policies work in practice. Empirical study and policy evaluation across countries is needed.

1. Which domestic climate policies have already been shown to be the most effective in practice (both sector-by-sector and economy-wide)? Which prove to be more or less expensive than anticipated a priori? Which lead to greater or less-than-expected mitigation and adaptation benefits?

2. Which specific policies, country-by-country, would be required to achieve deep decarbonization or "net zero" emissions?

3. Which factors, including institutional, political and socio-economic characteristics, influence the choice of policy instruments and their design? Why do countries decide to adopt certain policies over others? Is there policy diffusion and learning across countries? If so, what are the channels and their effects?

4. Under what conditions, and for which goals (i.e. mitigation, land use, adaptation), are economy-wide, geographic, or sectoral policies (including industrial policies) most appropriate?

5. How do policies interact with economy-wide and sector-specific instruments, as well as across jurisdictions?

6. How can public support be generated and maintained for different types of climate policies? How can policies be designed so that they garner more support over time?

7. How can review processes and flexibility be built into new policies so that they can be changed when necessary while still providing a stable and predictable policy environment?

8. What are the most appropriate and effective processes for tracking commitments, monitoring progress and identifying success regarding national and sub-national implementation? How can accountability mechanisms be developed to ensure the credibility of policies and commitments? How can voluntary actions of corporations and other non-state actors be tracked and included in the reporting on INDCs?

9. How do we structure institutions and policies to avoid negative consequences of investment or infrastructure-related policies (i.e. carbon lock-in, stranded assets, and maladaptation)? What mechanisms (including supply-side policies) can be established to remove high-carbon assets from the economy? What are the political economy factors that shape the shift away from high-carbon assets?

10. How can climate priorities be effectively integrated within multi-level decision-making processes? How can coordination between national and local government on climate policy be enhanced?

11. What are the distributional impacts of climate mitigation and adaptation policies, including across income groups, geographic regions, industry groups and communities? Which analytical tools can help policymakers assess these differential impacts?

12. What are the synergies and potential trade-offs between mitigation and adaptation priorities and policies? What kinds of decision-making processes would allow for these trade-offs to be managed? How can climate policy assessment tools be redesigned to incorporate co-benefits and prevent adverse impacts?

13. What policies would support the achievement of non-fossil targets and what are their strengths and weaknesses? Which policies support the most efficient and cost-effective scale-up of renewable energy technologies?

14. What are the successful business models for scaling up renewable energy and adaptation and resilience efforts? How applicable are lessons from pay-as-you-go informational technology services? What kind of capacity-building needs would such an approach require?

15. Are performance-based programs for mitigation, adaptation, or climate resilience effective? Under what conditions are they appropriate and how do they compare to alternatives?

16. How can global sustainability pathways be translated to national and sub-national transition road maps?

17. How do we regulate sectors that do not conform to national boundaries such as international maritime and aviation?

4. Policy Analysis and Evaluation Tools

A range of policy instruments and policy mixes are often identified for mitigation, adaptation and resilience. While we have accumulated significant knowledge about the formal properties of these instruments, we need far greater understanding about the contextual factors that shape the implementation and operation of these instruments, how various instruments interact in the same jurisdiction, and the suitability of instruments in different contexts, including in countries at different stages of development.

1. How do we improve integrated assessment models and the assumptions that go into them? In particular, how can social sciences such as comparative politics be more closely engaged with modeling communities? How can modeling methods and results be made more transparent and accessible and be better understood by the policymaking community? How can transparency in methodologies be incentivized? How can findings from bottom-up and sectoral approaches be better integrated into models?

2. How can we address the significant gap between typical integrated assessment models and actual economic and energy transitions happening in various national contexts? What economic trends, beyond just GDP growth, can best capture the mechanics of the energy transition?

3. How do we define and measure transformational change?

4. How can we improve comparability of modeling approaches? Do we need universal standards?

5. What are the best practices for communicating the output of scientific assessments to policy makers and the public? How can the uptake of results of the IPCC and other major assessments be increased?

6. Given that INDCs use different types of policies and measures, targets, and timetables across countries, what are the best metrics and methods to compare them? Should the different targets in INDCs be translated into similar metrics that are traceable and verifiable? If so, how should this be done? How can these different targets be compared to determine the level of ambition of different countries' INDCs going forward?

7. Which metrics are best suited to measure progress in adaptation and resilience? How should various dimensions such as water, biodiversity, infrastructure, and human capacity be included in such measurement?

5. Innovation and Learning

The post-Paris landscape presents significant opportunities for learning and innovation. Research can help capture early experiences with policy implementation and share them so that others can learn from successes and failures. The "bottom up" approach of the INDCs will allow for a rich diversity of experimentation and innovation in policy design and implementation. The high level of ambition required to achieve global mitigation and adaptation goals will also require transformative new solutions to climate change, including but not limited to refinements and improvements to existing technologies and the development of new technologies.

1. What lessons can we learn from countries that have been leaders in experimenting with new climate policies, both for mitigation and adaptation?

2. How can research programs be designed more effectively to address actionable policy goals? How do we get a better balance between science-push and demand-pull policies? How can the generation and transfer of policy-relevant knowledge be facilitated, and what models best bridge the research-practitioner divide?

3. Which policies are needed to encourage deployment of technology, and bring innovation to scale? What drives early innovation processes, particularly for fundamental, pre-market research and development? What is the role of governments in a globalized innovation process? How can the significant financial cost and risk associated with technology demonstration be shared between the public and private sector?

4. Which policies are needed to scale up the rate of deployment of renewable energy technologies? What are the different kinds of financing needs that must be met to allow technologies to be scaled?

5. Which industrial policies best foster small and medium-sized enterprise activities to reach low-carbon goals? Which skills and types of training are needed to transition workers from carbon-intensive industries to cleaner ones?

6. Are existing multilateral institutions effectively testing new ideas and sharing new discoveries? Are there impediments to innovative risk-taking in existing institutions that can be overcome through the international negotiations process?

7. Which indicators are available, and what indicators are needed, to compare innovation capabilities across both developed and developing countries?

8. What are the most critical technology, knowledge and financial needs in developing countries? What are best practices in South-South transfer? What unique barriers may exist in these contexts? What kinds of collaborations could best deepen research in these areas?

9. What do we know about effective innovation policy for adaptation and resilience? What lessons can be learned from innovation systems research on mitigation that would be relevant for adaptation? How might these systems be unique?

10. What are the prospects for carbon capture and storage? Are the main barriers to full deployment technological, financial, or other? If deployed, what are the differentiated impacts on the use of coal, oil and gas?

11. Which technologies or innovation pathways are required to achieve negative emissions, an objective of increasing importance because most of the 2°C pathways (and all 1.5°C pathways) include negative emissions? How should governments and the private sector devise new innovation policies in support of these technologies?

12. What is the future of the electric grid? How can promising technical or engineering proposals (such as ultra-high-voltage transmission) make it to the market? Is increased decentralization in electric transmission necessary or likely? What is the potential and cost/benefit for decentralization in renewables? How can electric grids, particularly micro-grids, be best targeted at the transport sector? How can improved energy storage technologies help facilitate an energy transition?

Conclusion

The scope and magnitude of the current social science research needs for climate change policy are significant. By compiling and integrating the thoughts of many experts, this paper is intended to have a long-term impact on policymaking by inspiring and catalyzing rigorous, targeted research that ultimately informs governments as they take their next steps. Given how profoundly climate policy can alter economies and societies in the coming decades, we hope that this paper inspires governments, firms, and philanthropists to devote greater resources to getting climate policy right. Finally, we anticipate that the breadth of the issues considered in this paper will help to demonstrate the fundamental need for integrated and interdisciplinary research methods for climate change. ■

List of Contributors

Chizuru Aoki
Lead Environmental Specialist, the Global Environment Facility

Claudio Alatorre
Senior Climate Change Specialist, Inter-American Development Bank

Austin Brown
Senior Policy Analyst, Office of Science and Technology Policy, White House

Rishikesh Ram Bhandary
PhD Candidate, The Fletcher School, Tufts University

Daniel Bodansky
Faculty Co-director, Center for Law and Global Affairs

Georg Børsting
Senior Adviser, Norway's Ministry of Foreign Affairs

Quamrul Chowdhury
Bangladesh's Climate Envoy to the UN and Lead Negotiator for LDCs

Reid Detchon
Vice President, Energy and Climate Strategy, United Nations Foundation

Navroz Dubash
Senior Fellow, Center for Policy Research

Zaheer Fakir
Head of International Governance and Relations, Department of Affairs of South Africa, Co-Chair of the Green Climate Fund Board

Janine Felson
Deputy Permanent Representative to the United Nations in New York, Belize

Christiana Figueres
Executive Secretary, UNFCCC

Kevin P. Gallagher
Professor of Global Development Policy, Pardee School of Global Studies, Boston University

Kelly Sims Gallagher
Professor of Energy and Environmental Policy and Director of Center for International Environment and Resource Policy, The Fletcher School, Tufts University

Tarun Gopalakrishnan
MALD Candidate, The Fletcher School, Tufts University

Thomas Hale
Associate Professor of Public Policy, Blavatnik School, Oxford University

Thomas Heller
Founder and Executive Director, Climate Policy Initiative

John Holdren
Science Advisor to The President and Director, Office of Science and Technology Policy

Saleemul Huq
Director, International Centre for Climate Change and Development

Paul Jefferiss
Head of Policy, BP

Kelly Levin
Senior Associate, World Resources Institute

Jiang Lin
Senior Vice President, China Strategy and Analysis, Energy Foundation

Shaanti Kapila
Senior Knowledge Management Officer, Climate Investment Funds

Nathaniel Keohane
Vice President, Environmental Defense Fund

Farrukh Khan
Senior Advisor, Office of the Secretary-General of the United Nations

Laura Kuhl
PhD Candidate, The Fletcher School, Tufts University

Pradeep Kurukulasuriya
Head of Climate Change Adaptation Programming, UNDP

Rachel Kyte
CEO, Sustainable Energy for All and Non-Resident Professor of Practice at
The Fletcher School, Tufts University

Joanna Lewis
Associate Professor of Science, Technology and International Affairs, Georgetown University

Amy Luers
Assistant Director for Resilience, Office of Science and Technology Policy

Joanna Messing
Executive Director, Growald Family Fund

Gilbert E. Metcalf
Professor of Economics, Tufts University

Rawleston Moore
Senior Climate Change Specialist, Global Environment Facility

Jennifer Morgan
Global Director of the Climate Program, World Resources Institute

Claudia Ortiz
Climate Finance Policy Advisor, UNDP

Mihaela Papa
Lecturer in Sustainable Development and Global Governance, The Fletcher School, Tufts University

Lynn Price
Leader, China Energy Group, Lawrence Berkeley National Laboratory

Sue Reid
Vice President of Climate and Clean Energy Programs, Ceres

Jim Skea
Professor of Sustainability Energy, Imperial College and Co-chair of the IPCC's Working Group III

Athena Ronquillo-Ballesteros
Director, Sustainable Finance Center, World Resources Institute

Liane Schalatek
Associate Director, Henrich Böll Foundation North America

Thomas Spencer
Program Director, Institute for Sustainable Development and International Relations (IDDRI)

Robert Stowe
Executive Director, Environmental Economics Program and Manager, Project on Climate Agreements, Harvard University

Aaron Strong
PhD Candidate in Environment and Resources, Stanford University

Lisa Tessier
MALD Candidate, The Fletcher School, Tufts University

Joe Thwaites
Research Analyst, World Resources Institute

Patrick Verkooijen
Deputy Special Envoy for Climate Change, World Bank

Gloria Visconti
Lead Climate Change Specialist, Inter-American Development Bank

Florin Vladu
Manager, UNFCCC Secretariat

Xiliang Zhang
Professor and Executive Director of the Institute for Energy, Environment and Economics, Tsinghua University

Zou Ji
Deputy Director-General, National Center for Climate Change Strategy and International Cooperation, China

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